

Village of Sherburne, New York Greenhouse Gas Emissions Inventory 2018

Compiled by:
The Village of Sherburne
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Introduction

This data from 2018 greenhouse gas (GHG) emissions in the Village of Sherburne, New York, serves as a preliminary step in creating strategies to reduce GHG emissions. It is important for local government to understand their Village emission levels and their impacts as it allows them to prioritize actions when creating a local Climate Action Plan to mitigate the effect of these emissions.

This Greenhouse Gas Inventory was prepared as a component of the Village of Sherburne's participation in the Climate Smart Communities program of the New York State Department of Environmental Conservation. The inventory was prepared by Tyler White, Climate Smart Communities Intern, and Travis DuBois, Superintendent Village of Sherburne Municipal Electric Department, on behalf of the Village of Sherburne and under the guidance of Terrance Carroll, Clean Energy Communities Coordinator in the Southern Tier and a template created by Cornell Cooperative Extension of Tompkins County.

Communities that have been certified as Climate Smart Communities are committed to reducing GHG emissions and improving climate resilience, which allows them to reduce long-term costs and adapt to a changing climate.

Greenhouse Gas Emission and Energy Use in New York State

Greenhouse gases are gases that trap heat in the Earth's atmosphere when they accumulate in high concentrations. Common greenhouse gases include carbon dioxide, methane, nitrous oxide, and fluorinated gases, which are synthetic gases produced by industrial processes. These gases are released into the atmosphere in several ways: everyday activities of all kinds can have a direct impact on greenhouse gas emissions and climate change.

Some gases have a greater impact on the atmosphere than others, but together, these gases combine to "thicken the Earth's blanket" and change climatic conditions. For example, methane gas has a higher warming effect on the atmosphere than carbon dioxide but dissipates more quickly. Some of these gases, such as water vapor, carbon dioxide, and methane, occur naturally in small percentages, and help the atmosphere retain enough heat to sustain life. This balance is disrupted, however, by greenhouse gas emissions from human activity, which cause the atmosphere to retain more energy from the sun than it normally would. This seemingly small

change in the atmosphere's composition has already led to big changes in temperature and weather all over the world.

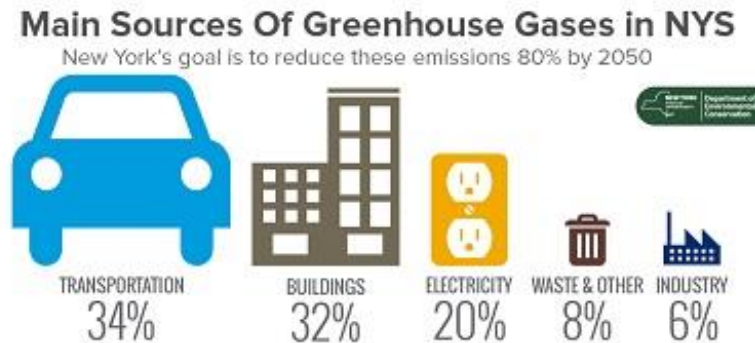


Image source: New York Department of Environmental Conservation
http://www.dec.ny.gov/images/administration_images/ghgsrcsm.jpg

Greenhouse gas emissions in New York State come mostly from transportation (34%). This includes all travel of people and goods by cars, trucks, ships, airplanes, trains, and other vehicles. Greenhouse gases in the state are also largely produced by the industrial sector from the manufacturing processes that create the goods and raw materials that we use every day. Residential and commercial activity contributes as well, mostly resulting from heating, cooking, wastewater management, and refrigerant leaks. GHG emissions in rural areas of New York State also come from soil management of agricultural land that releases nitrous oxide into the atmosphere. These activities include the use of synthetic and organic fertilizers, growing nitrogen-fixing crops, and various irrigation processes. Livestock also contribute to GHG emissions, as their natural digestive processes produce methane. This can be exacerbated or mitigated by proper management of livestock waste.

A variety of research, including New York's Climate Aid report (2011, 2014) and the National Climate Assessment (2014), has shown that impacts of climate change have already begun to occur in New York State. Climate change manifests as changes in temperature, precipitation, sea levels, seasonal changes, and severe weather events. These changes have direct effects on the health of humans, animals, and plants in New York State.

Since 1970, the average annual temperature has risen by 2.4°F in New York State. Average winter temperatures have increased by over 4.4°F. Climate change has also resulted in increased precipitation in the winter, and less in the summer. Climate change also includes climactic events beyond global warming, namely an increase in severe weather events, such as superstorms and hurricanes. Between 1958 and 2010, the number of very heavy precipitation events increased by over 70% in the United States. New York's coastal areas have seen a sea level rise of over a foot since 1900. Sea level rise is a result of climate change, which causes warmer temperatures that melt polar caps, glaciers, and land-based ice. Sea level rise is especially imminent in New York State, where the rate of rise (1.2 inches per decade) is nearly twice as high as the global rate (0.7 inches per decade). Climate change has also resulted in variation in seasonal patterns. In New York State, for example, spring begins a week earlier than it once did. The first leaf date in autumn is, correspondingly, over a week late.

Village of Sherburne, New York: Greenhouse Gas Inventory (2018)

Once greenhouse gases are emitted into the atmosphere, they can linger for decades or even centuries, even if emissions are reduced in the future. It is important to understand how greenhouse gas emissions are affecting our region to create strategies for reducing future greenhouse gas emissions. Modelling has projected that climate change will continue in New York State. The region will experience more precipitation, more variability in precipitation, and warmer temperatures. By 2020, average precipitation will increase by up to 8%, compared to the 1971-2000 period, and annual average temperatures will increase by 3°F.

Climate change also negatively impacts the availability of clean air, water, and food supplies. Changing environmental conditions in New York State also help insects, such as mosquitoes and ticks, spread infectious diseases such as West Nile virus and Lyme disease. Human health is also affected directly by the changing climate, especially those, like the elderly and children, who are already vulnerable. This can be caused by things such as increased pollen production, ground-level ozone formation, or the presence of other forms of air pollution. All these factors exacerbate asthma, allergies, and other respiratory conditions.

In summary, greenhouse gas emissions and the climate change that they cause have already begun to affect the health and sustainability of communities in New York State. These negative effects can be partially mitigated, however, by reducing greenhouse gas emissions and the activities that create them. This Greenhouse Gas Inventory for the Village of Sherburne, New York, serves as a first step in taking action to plan for a healthier and more environmentally responsible community that may be enjoyed for generations to come.

Methodology

The calculations in this report were performed using the Climate Smart Communities Local Government Greenhouse Gas Accounting Tool and the EPA's Local Greenhouse Gas Inventory Tool provided by the New York State Department of Environmental Conservation. The tool is based on the Local Government Operations Protocol, which serves as a national standard for municipal greenhouse gas inventories across the country. Buildings emissions data for the Village of Sherburne was collected from the Village of Sherburne Municipal Electric over a 12-month period. Vehicle emissions data was gathered through municipal fuel logs, bills, and surveys of Village staff. Solar Electric production was based on a running log kept by the Village.

Stationary Combustion of Fossil Fuels: Natural Consumption in Municipal Departments

The stationary combustion of fossil fuels is used to heat the influent at the wastewater treatment plant. The Municipal Building stationary combustion is used to heat the Firehouse portion of the Municipal Building.

2018 Stationary Combustion of Fossil Fuels by Municipal Departments (MMBtu)

Departments	Energy Usage (MMBtu)
Water & Sewer	1,608
Municipal Building	677
Electric	--
Total Stationary Combustion Energy Usage	2,285

There is no comparison between different years since all differences are a result of weather and fluctuating wastewater intake volumes. The stats from 2018 will be used as a baseline as the Village of Sherburne prepares to make upgrades to the heating systems.

Electricity Consumption in Municipal Departments

The electricity consumption for the Water and Sewer Department is used primarily to run the pumps for both drinking water and wastewater. The electricity consumption for the DPW is used for lighting and some electric heating in the Municipal Office. The Electric Department's electricity consumption is used to power the Village's streetlights as well as lighting and climate control in the DPW and Electric Department building.

2018 Electrical Consumption by Municipal Department (kWh)	
Department	2018 Electrical Use (kWh)
Water & Sewer	625,771
DPW	85,885
Electric	423,101
Total Electrical Consumption	1,134,757

The lack of a comparison between years is again because the Village has not made any changes to affect an increase or decrease in electric usage. The Village of Sherburne has zero emissions from electrical consumption due to an agreement with the New York Power Authority (NYPA) which provides the Municipality power from the Niagara and St. Lawrence hydropower projects.

2018 GHG Emissions from Electricity by Municipal Department (MT CO ₂ E)	
Department	2018 CO ₂ Emissions
Water & Sewer	0
DPW	0
Electric	0
Total Emissions from Electricity	0

The Village currently has an agreement that will allow the electricity to remain carbon free through the year 2040.

Mobile Combustion of Fossil Fuels: Municipal Vehicle Fleet

In 2018, the mobile fleet in the Village of Sherburne consisted of 14 vehicles: 7 of which consumed gasoline, 6 of which consumed diesel, and 1 gasoline plug-in hybrid. In 2018, the municipal vehicle fleet in the Village of Sherburne used a total of 1420 British Thermal Units (MMBtu) of energy, from 10,944.14 gallons of fossil fuel. There has been no change to the efficiency of the Village of Sherburne’s fleet due to improvements made by the Village. The improvements in the fleet have only been a result of the improved fuel efficiency of vehicles by the manufacturers. Therefore, the comparison of multiple years is irrelevant now. The addition of the hybrid vehicle by the Village of Sherburne did not replace another, less efficient, vehicle it only allowed for a more efficient alternative for transportation.

2018 Vehicle Fossil Fuel Use by Type (MMBtu)			
Year	Gasoline	Diesel	Total
2018	868	552	1420

2018 GHG Emissions from Municipal Vehicle Fleet (MT CO₂E)
2018 CO ₂ Emissions
107

Summary: Greenhouse Gas Emission in the Village of Sherburne, New York

2018 GHG Emission Source (MT CO₂E)				
Year	Stationary Combustion	Electricity	Mobile Combustion	Total
2018	169.08	00	106.64	275.72

The Year 2018 will serve as a baseline year for the Village of Sherburne to show improvement in their emissions production. The Village’s emission production should decrease in years to come as technology becomes more energy efficient and the Village modernizes its fleet of vehicles.

Conclusions: Impacts and Further Action

Village of Sherburne, New York: Greenhouse Gas Inventory (2018)

In 2018, the Village of Sherburne created 275.72 metric tons of carbon dioxide equivalent. This is approximately equivalent to 768,077 miles driving in an average passenger car.

The Village of Sherburne has taken the initiative to lower future emissions by upgrading the oil-fired boilers at the Wastewater Treatment Plant to a more efficient and far-less emitting electric boiler. The Village will also be replacing the oil-fired boilers in the Municipal Office with electric models. The change from oil fired to electric will drastically lower the Village's emissions as the Village has a contract for carbon-free electricity through 2040. The Village of Sherburne will continue to have at least one electric powered car in the fleet. The Village is continuing to recycle and compost appropriate materials. The Village will also be installing a Level 3 dual charging station by the municipal office to allow for charging of electric vehicles owned by the Village, Village employees, or the public.

For questions regarding this greenhouse gas inventory report, please contact:

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Sources and Further Information

United States Environmental Protection Agency: Greenhouse Gas Overview
<https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

New York State Department of Environmental Conservation: Impacts of Climate Change in New York
<http://www.dec.ny.gov/energy/94702.html>

New York State Department of Environmental Conservation: Mitigation of Climate Change
<http://www.dec.ny.gov/energy/99223.html>

New York State Department of Environmental Conservation: Climate Change and Health
<http://www.dec.ny.gov/energy/68917.html>

U.S. Department of Energy Office of Energy Efficiency and Renewable Energy
<https://www.fueleconomy.gov/feg/evtech.shtml>

University of Michigan Center for Sustainable Systems
<http://css.umich.edu/factsheets/carbon-footprint-factsheet>